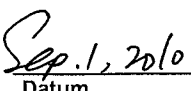



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<b>Auftraggeber:</b> <i>Client:</i>		Zhongshan K-mate General Elec. Co., Ltd. Fuwan Industrial Zone, Fuwan South Road, Sunwen East Road, East District, Zhongshan, Guangdong 528403, P.R. China	
<b>Gegenstand der Prüfung:</b> Bluetooth Car Kit <i>Test item:</i>			
<b>Bezeichnung:</b> <i>Identification:</i>		<b>BTC009</b>	<b>Certificate Number:</b> FCC ID: WAD-BTC009B <i>Certificate Number</i>
<b>Wareneingangs-Nr.:</b> <i>Receipt No.:</i>		<b>173054591</b>	<b>Eingangsdatum:</b> July 13, 2010 <i>Date of receipt:</i>
<b>Prüfort:</b> <i>Testing location:</i>		TÜV Rheinland (Guangdong) Ltd. EMC Laboratory  Guangzhou Auto Market, Yuan Gang Section of Guangshan Road, Guangzhou 510650,  P. R. China	Listed test laboratory according to FCC rules section 2.948 and RSS- Gen, for measuring devices.
<b>Prüfgrundlage:</b> <i>Test specification:</i>		ANSI C63.4: 2003  FCC Part 15: July 10, 2008, Subpart C section 15.209 and 15.247  RSS-GEN Issue 2, June 2007 RSS-210 Issue 7, June 2007 RSS-102 Issue 2, November 2005	
<b>Prüfergebnis:</b> <i>Test Result:</i>		Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test item passed the test specification(s).</i>	
<b>Prüflaboratorium:</b> <i>Testing Laboratory:</i>		TÜV Rheinland (Guangdong) Ltd.	
<b>geprüft/ tested by:</b>		<b>kontrolliert/ reviewed by:</b>	
 Sep. 1, 2010 Datum Date		 Sep. 1, 2010 Datum Date	
Ken Kuang Project Engineer Name/Stellung Name/Position		Liangdong Xie Project Manager Name/Stellung Name/Position	
Unterschrift Signature		Unterschrift Signature	
<b>Sonstiges/ Other Aspects:</b>			
<b>Abkürzungen:</b> P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet		<b>Abbreviations:</b> P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested	
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.			

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## Test Summary

FCC and IC test specification		Test items	Result
FCC rules	RSS rules		
Part 15 Per Section 15.209(a)	RSS-210 Issue 7 Section 2.6	Transmitter Radiated Spurious Emission	Pass
--	RSS-210 Issue 7 Section 2.3	Receiver Radiated Spurious Emission	Pass
Part 15 Per Section 15.203	--	Antenna Requirement	Pass
Part 15 Per Section 15.247(b)(1)	RSS-210 Issue 7 Section A8.4 (2)	Maximum Peak Conducted Output Power	Pass
Part 15 Per Section 15.247(a)(1)	RSS-210 Issue 7 Section A8.1(a)	20dB Bandwidth	Pass
Part 15 Per Section 15.247(a)(1)	RSS-210 Issue 7 Section A8.1(b)	Hopping Channel Carrier Frequency Separation	Pass
Part 15 Per Section 15.247(a)(1)(iii)	RSS-210 Issue 7 Section A8.1(d)	Number of Hopping Frequency Used	Pass
Part 15 Per Section 15.247(a)(1)(iii)	RSS-210 Issue 7 Section A8.1(d)	Time of Occupancy (Dwell Time)	Pass
Part 15 Per Section 15.247(d)	RSS-210 Issue 7 A8.5	Out-Of-Band Emission measurement	Pass
--	RSS-102 Issue 2 Section 2.5.1	Exemption from Routine Evaluation Limits – SAR Evaluation	Pass

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## **1 General Remarks**

### **1.1 Complementary Materials**

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test result

## **2 Test Sites**

### **2.1 Test Facilities**

**TÜV Rheinland (Guangdong) Ltd. EMC Laboratory**

Guangzhou Auto Market, Yuan Gang Section of Guangshan Road  
Guangzhou 510650

P. R. China

## 2.2 List of Test and Measurement Instruments

**Table 1: List of Test and Measurement Equipment**

Kind of Equipment	Type	Manufacturer	S/N	Calibrated until	Calibrated Interval
EMI Test Receiver	ESCI-3	Rohde & Schwarz	100216	2011-03-16	1 year
Spectrum Analyzer	FSP30	Rohde & Schwarz	100286	2011-03-16	1 year
Loop Antenna	HFH2-Z2	Rohde & Schwarz	100111	2011-03-16	1 year
Trilog-Broadband Antenna	VULB9168	SCHWARZBECK MESS- ELEKTRONIK	209	2011-08-21	2 years
Double-Ridged Waveguide Horn Antenna	HF906	Rohde & Schwarz	100385	2011-08-24	2 years
Pre-amplifier	AFS42-00101800- 25-S-42	MITEQ	1101599	2011-03-16	2 years
Band Reject Filter	BRM50702	Micro-Tronics	023	2011-03-16	2 years
Standard Gain Horn Antenna	3160-09	EMCO	21642	2014-06-26	5 years
Pre-amplifier	AFS33-18002650- 30-8P-44	MITEQ	1108282	2011-03-16	2 years
3m Anechoic Chamber	N/A	Albatross Project GmbH	N/A	2011-03-16	1 year
Spectrum Analyzer	E4404B	Agilent	MY414 40753	2011-03-16	1 year

## 2.3 Traceability

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations.

## **2.4 Calibration**

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

## **2.5 Measurement Uncertainty**

Uncertainty for conducted emissions measurements is  $\pm 2.68\text{dB}$ .

Uncertainty for radiated emissions measurements is  $\pm 4.94\text{dB}$  (30MHz-1GHz),  $\pm 4.88\text{dB}$  (>1GHz).

The reported expanded uncertainty is based on a standard uncertainty multiply by a coverage factor  $k=2$ , providing a level of confidence of approximately 95%.

## **2.6 Location of original data**

The original copies of test data taken during actual testing were attached at Appendix 1 of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Guangdong) file for certification follow-up purposes.

## **2.7 Status of facility used for testing**

TÜV Rheinland (Guangdong) Ltd. EMC Laboratory; Guangzhou Auto Market, Yuan Gang Section of Guangshan Road, Guangzhou 510650, P. R. China is listed on the US Federal Communications Commission list of facilities approved to perform measurements, the register no. 833845

TÜV Rheinland (Guangdong) Ltd. EMC Laboratory; Guangzhou Auto Market, Yuan Gang Section of Guangshan Road, Guangzhou 510650, P. R. China is listed on Certification and Engineering Bureau of Canada, whose file number is IC 2932C.

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### 3 General Product Information

The submitted sample is a Bluetooth car kit for vehicular use.

#### 3.1 Product Function and Intended Use

Refer to user manual for more information.

#### 3.2 Ratings and System Details

Bluetooth Specification	:	V2.1+EDR
Frequency range	:	2402.0MHz – 2480.0MHz
Total Number of channels	:	79 channels
Channel Spacing	:	1MHz
Modulation Type	:	FHSS
Type of antenna	:	Integral antenna
Power supply	:	12V-24V DC by vehicle battery
Ports	:	12V-24V DC input port
Protection Class	:	III

The above information was declared by client. Refer to the Technical Documentation for further information



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### **3.3 Independent Operation Modes**

- A: RF Transmitting and receiving at BR mode.
- B: RF Transmitting and receiving at EDR mode

For further information refer to User Manual

### **3.4 Submitted Documents**

- Operation Description
- Block Diagram
- Schematics
- FCC and IC label and its location
- User Manual
- Internal Photos
- External Photos
- Application form

## 4 Test Set-up and Operation Mode

### 4.1 Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

### 4.2 Test Operation and Test Software

Refer to test set-up in chapter 5.

### 4.3 Special Accessories and Auxiliary Equipment

The products have been tested together with the following device:

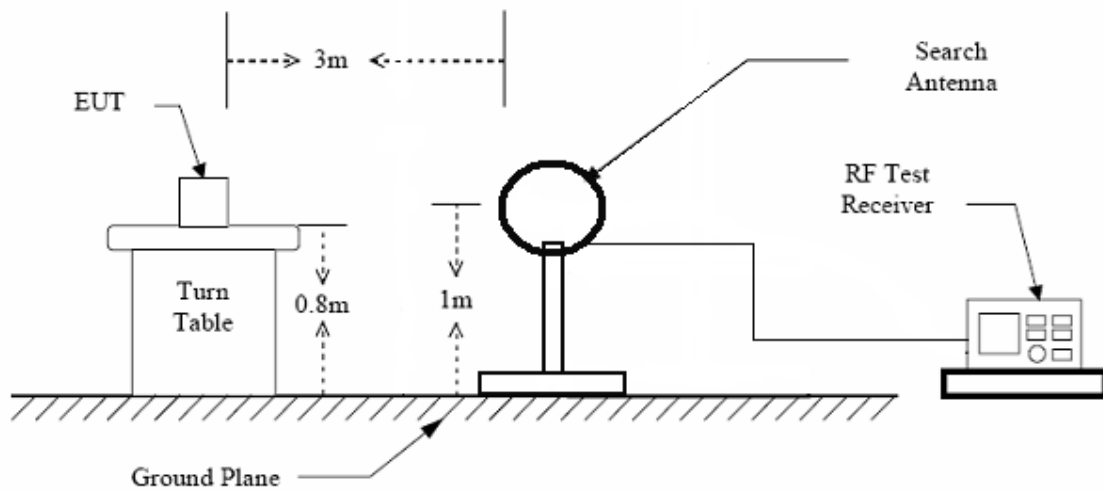
Device	Manufacture	Model	Serial no./ Version
Laptop notebook	IBM R40e	2684	99-CYY55
Bluetooth test Software	CSR	BlueTest	1.2.4

### 4.4 Countermeasures to achieve EMC Compliance

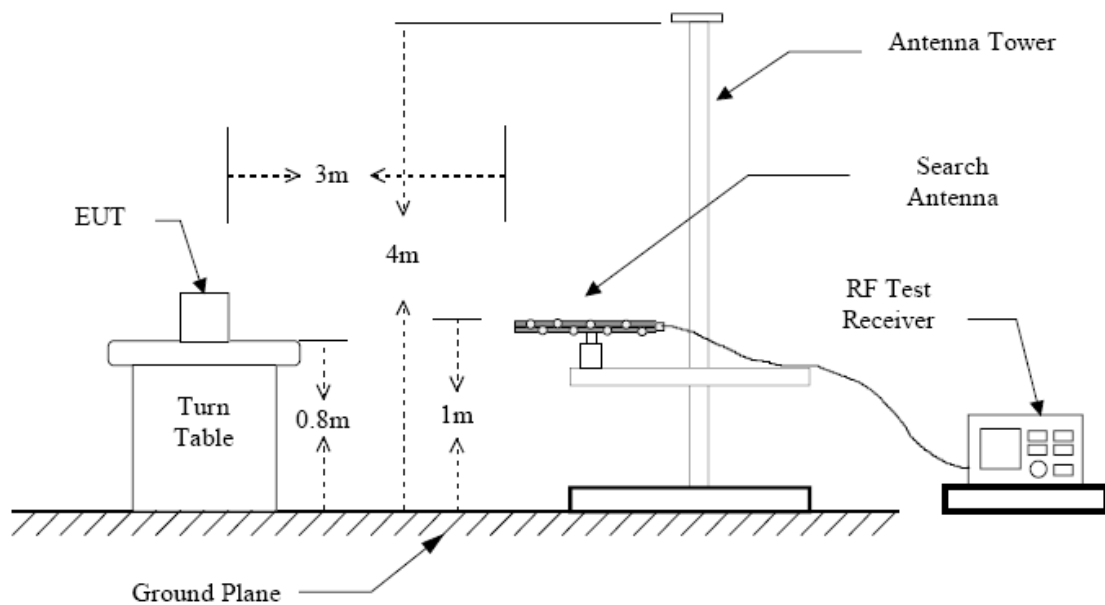
The test sample, which has been tested, contained the noise suppression parts as described in the technical document. No additional measures were employed to achieve compliance.

## 4.5 Test set-up

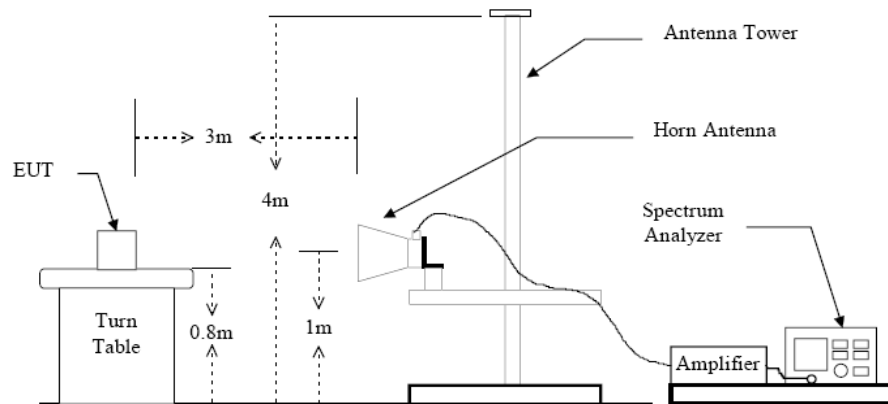
### Diagram 1 of Configuration for Testing Radiated Emission below 30MHz



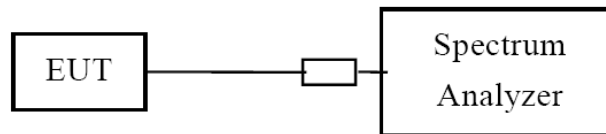
### Diagram 2 of Configuration for Testing Radiated Emission from 30MHz to 1 GHz



**Diagram 3 of Configuration for Testing Radiated Emission above 1 GHz**



**Diagram 4 of Configuration for Testing other test items**



## 5 Test Results

During the test, the power supply voltage was found to have very small impact on the test result. All tests result in this report were gained with a power supply of DC 12V.

### 5.1 Transmitter Radiated Spurious Emission

**RESULT:**

**Pass**

Date of testing	:	July 20, 2010
Test specification	:	FCC Part 15 Per Section 15.209(a) RSS-210 Per Section 2.6
Limits	:	FCC Part 15 Per Section 15.209(a) RSS-210 Per Section 2.6, table 2
Test procedure	:	Procedure specified in ANSI C63.4/RSS-Gen were followed
Deviations from Standard Test procedures	:	None
Kind of test site	:	3m Semi-anechoic chamber
Operation mode	:	Transmitting at BR / EDR mode
Power supply	:	DC 12V
Temperature	:	23°C
Humidity	:	50%

**Test procedure:**

1. The EUT was placed on the top of a rotatable table 0.8 meters above the ground with 3-orthogonal direction and be kept close enough to the receiving antenna. The table was rotated 360 degrees to determine the suspected emission frequency and the position of the worst radiation case with both horizontal and vertical antenna polarization.
2. The EUT was then set 3 meters away from the receiving antenna, which was mounted on a variable-height antenna tower.
3. For each suspected emission frequency recorded in step 1, the EUT was arranged to its worst case and:  
for tests below 30MHz the loop antenna is positioned with its plane vertical and the center of it is 1m above the ground. During the tests it is rotated about its vertical axis for maximum response at each azimuth about the EUT;  
for tests above 30MHz the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to read the maximum emission.
4. The RBW and VBW of the test receiver were 120 kHz and 120 kHz for Quasi-peak detection at frequency below 1GHz.  
The RBW and VBW of the test receiver were 1MHz and 3MHz for Peak detection at frequency above 1GHz.  
For Average measurement at frequency above 1GHz. The resolution bandwidth of the test receiver was 1MHz, video bandwidth is 10Hz. If the peak value was below the AV limit, AV measurement was skipped.

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**Table 2: Radiated Emission (BR mode, Transmitting at 2402MHz)**

Frequency	QP	AV	PK	Polarity	Limit		
					QP	AV	PK
[MHz]	[dB $\mu$ V/m]			(H/V)	[dB $\mu$ V/m]		
1601.00	N/A	--	40.2	H	N/A	54	74
3204.00	N/A	--	40.9	H	N/A	54	74
4804.00	N/A	50.6	57.7	H	N/A	54	74
10607.00	N/A	--	49.2	H	N/A	54	74
1601.00	N/A	--	41.3	V	N/A	54	74
3565.00	N/A	--	41.1	V	N/A	54	74
4804.00	N/A	49.8	56.1	V	N/A	54	74
8493.00	N/A	--	47.1	V	N/A	54	74
*)---							

**Table 3: Radiated Emission (BR mode, Transmitting at 2441MHz)**

Frequency	QP	AV	PK	Polarity	Limit		
					QP	AV	PK
[MHz]	[dB $\mu$ V/m]			(H/V)	[dB $\mu$ V/m]		
1627.00	N/A	--	42.3	H	N/A	54	74
3255.00	N/A	--	40.0	H	N/A	54	74
4882.00	N/A	45.5	57.4	H	N/A	54	74
11572.00	N/A	--	50.3	H	N/A	54	74
1627.00	N/A	--	44.6	V	N/A	54	74
4882.00	N/A	45.5	56.1	V	N/A	54	74
7430.00	N/A	--	46.5	V	N/A	54	74
11631.00	N/A	--	49.4	V	N/A	54	74
*)---							

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**Table 4: Radiated Emission (BR mode, Transmitting at 2480MHz)**

Frequency	QP	AV	PK	Polarity	Limit		
					QP	AV	PK
[MHz]	[dB $\mu$ V/m]			(H/V)	[dB $\mu$ V/m]		
1653.00	N/A	--	40.3	H	N/A	54	74
3308.00	N/A	--	40.9	H	N/A	54	74
4960.00	N/A	39.7	55.6	H	N/A	54	74
9540.00	N/A	--	51.0	H	N/A	54	74
1653.00	N/A	--	42.1	V	N/A	54	74
3308.00	N/A	--	39.6	V	N/A	54	74
4960.00	N/A	41.2	56.5	V	N/A	54	74
9496.00	N/A	--	48.6	V	N/A	54	74
*)---							

\*) Measurement is made from 26MHz to 26 GHz. Disturbances other than those mentioned above are small or not detectable.

Emission at BR mode was found to be the worse case in the test.

Refer to appendix 1 for the test





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Frequency	QP	AV	PK	Polarity	Limit		
					QP	AV	PK
[MHz]	[dB $\mu$ V/m]			(H/V)	[dB $\mu$ V/m]		
3535.00	N/A	--	40.5	V	N/A	54	74
6498.00	N/A	--	44.8	V	N/A	54	74
*)---		--					

\*) Measurement is made from 30 MHz to 8GHz. Disturbances other than those mentioned above are small or not detectable.

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### **5.3 Antenna requirement**

**RESULT:**

**Pass**

Date of testing : ---  
Test specification : FCC Part 15 Per Section 15.203  
FCC Part 15 Per Section 15.247(b)

For intentional device, according to 15.203, and intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to 15.247(b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by amount in dB than the directional gain of the antenna exceeds of 6dBi.

As the antenna is permanently mounted on RF Board, there is no possibility of replacement.

And the max gain of the antenna is 2dBi.

## 5.4 Maximum Peak Conducted Output Power

**RESULT:**

**Pass**

Date of testing	:	July 22, 2010
Test specification	:	FCC Part 15 Per Section 15.247(b)(1) RSS-210 Issue 7 Section A8.4 (2)
Limits	:	FCC Part 15 Per Section 15.247(b)(1) RSS-210 Issue 7 Section A8.4 (2) For frequency hopping systems operating in the band 2400-2483.5 MHz employing at least 75 hopping channels, the maximum peak conducted output power shall not exceed 1 W.
Deviations from Standard Test procedures	:	None
Test procedure	:	Procedure specified in ANSI C63.4/RSS-Gen were followed
Kind of test site	:	Shielded room
Operation mode	:	Transmitting at BR / EDR mode
Power supply	:	DC 12V
Temperature	:	22°C
Humidity	:	50%

**Test procedure:**

1. Connect the antenna output of the EUT to the power meter by a low lost cable.
2. Set the EUT to proper test mode with relative test software and hardware.
3. Read the power from power meter and add the cable loss correction.

**Table 6: Peak Conducted Power (BR mode)**

Channel	Frequency (MHz)	Power Reading(dBm)	Cable Loss (dB)	Output Power		Limit (mW) *
				(dBm)	(mW)	
Low	2402	5.98	0.40	6.38	4.35	1000
Mid	2441	6.11	0.40	6.51	4.48	1000
High	2480	5.60	0.40	6.00	3.98	1000

**Table 7: Peak Conducted Power (EDR mode)**

Channel	Frequency (MHz)	Power Reading(dBm)	Cable Loss (dB)	Output Power		Limit (mW) *
				(dBm)	(mW)	
Low	2402	4.27	0.40	4.67	2.93	1000
Mid	2441	4.34	0.40	4.74	2.98	1000
High	2480	3.71	0.40	4.11	2.58	1000

\*Note: Refer to the test result of "Number of Hopping Channel Used" for the non-overlap channel number.

## 5.5 20dB Bandwidth

**RESULT:**

**Pass**

Date of testing : July 22, 2010  
 Test specification : FCC Part 15 Per Section 15.247(a)(1)  
 RSS-210 Issue 7 Section A8.1 (a)  
 Limits : No limit  
 Deviations from Standard Test procedures : None  
 Test procedure : Procedure specified in ANSI C63.4/RSS-Gen were followed  
 Operation mode : Transmitting at BR / EDR mode  
 Kind of test site : Shielded room  
 Power supply : DC 12V  
 Temperature : 23°C  
 Humidity : 50%

**Test procedure:**

1. Connect the antenna port of the EUT to the spectrum analyzer by a low lost cable.
2. Set the EUT to proper test mode with relative test software and hardware.
3. Spectrum analyzer setting: Centered Frequency= measured channel, RBW=10kHz, VBW=10kHz.
4. Mark the peak power frequency point and the -20dB upper and lower frequency points.
5. Read the frequency delta value between the -20dB upper and lower frequency points.
6. Repeat step 2 to 5 until all the channels required are finished.

**Table 8: 20dB Bandwidth (BR mode)**

Channel	Frequency (MHz)	Test Result (kHz)	99% occupied bandwidth (kHz)
Low	2402	950	820
Mid	2441	945	820
High	2480	950	816

**Table 9: 20dB Bandwidth (EDR mode)**

Channel	Frequency (MHz)	Test Result (kHz)	99% occupied bandwidth (kHz)
Low	2402	1328	1169
Mid	2441	1335	1178
High	2480	1328	1187

Please refer to Appendix 1 for the plot.

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## 5.6 Hopping Channel Carrier Frequency Separation

**RESULT:**

**Pass**

Date of testing	:	July 22, 2010
Test specification	:	FCC Part 15 Per Section 15.247(a)(1) RSS-210 Issue 7 Section A8.1 (b)
Limits	:	FCC Part 15 Per Section 15.247(a)(1) RSS-210 Issue 7 Section A8.1 (b) Frequency hopping systems operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 0.125W.
Deviations from Standard Test procedures	:	None
Test procedure	:	Procedure specified in ANSI C63.4
Kind of test site	:	Shielded room
Operation mode	:	Bluetooth transmitting with hopping at the full channel set
Power supply	:	DC 12V
Temperature	:	23°C
Humidity	:	50%

**Test procedure:**

1. Connect the antenna port of the EUT to the spectrum analyzer by a low lost cable.
2. Set the EUT to proper test mode with relative test software and hardware.
3. Spectrum analyzer setting: Centered Frequency = measured channel, RBW = 100 kHz, VBW = 100 kHz, Frequency Span = wide enough to cover the adjacent channel.
4. Mark the peak power frequency point of the measured channel and its adjacent channel(s)
5. Read the frequency delta value between the measured channel and its adjacent channel(s)
6. Repeat step 3 to 5 until all the channels measured are finished.

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**Table 10: Hopping Channel Carrier Frequency Separation**

<b>Channel</b>	<b>Adjacent Hopping channel separation (kHz)</b>	<b>Limit</b>
Low	975	At least 25kHz or tow-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.  <i>Note: refer to table 8 and 9 for the value of 20dB bandwidth</i>
Mid	1005	
High	1005	

Please refer to Appendix 1 for the plot.

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## 5.7 Number of Hopping Frequency Used

**RESULT:**

**Pass**

Date of testing : July 22, 2010  
Test specification : FCC Part 15 Per Section 15.247(a)(1)(iii)  
RSS-210 Issue 7 Section A8.1 (d)  
Limits : FCC Part 15 Per Section 15.247(a)(1)(iii)  
RSS-210 Issue 7 Section A8.1 (d)  
Frequency hopping system in the 2400-2483.5 MHz  
band shall use at least 15 non-overlapping channels  
Deviations from Standard Test  
procedures : None  
Test procedure : Procedure specified in ANSI C63.4  
Kind of test site : Shielded room  
Operation mode : Bluetooth transmitting with hopping at the full channel  
set  
Power supply : DC 12V  
Temperature : 23°C  
Humidity : 50%

**Test procedure:**

1. Connect the antenna port of the EUT to the spectrum analyzer by a low lost cable.
2. Set the EUT to proper test mode with relative test software and hardware.
3. Spectrum analyzer setting: RBW = 100 kHz, VBW $\geq$ RBW, Frequency Span = wide enough to cover the channels to be plotted.
4. Set the spectrum analyzer to Max-hold mode and plot the result(s) with record of all hopping channel.

**Table 11: Number of hopping frequency**

Number of hopping frequency:	79
Limit:	At least 15 non-overlapping channels

Please refer to Appendix 1 for measurement data.

## 5.8 Time of Occupancy (Dwell Time)

**RESULT:**

**Pass**

Date of testing	:	July 22, 2010
Test specification	:	FCC Part 15 Per Section 15.247(a)(1)(iii) RSS-210 Issue 7 Section A8.1 (d)
Limits	:	FCC Part 15 Per Section 15.247(a)(1)(iii) RSS-210 Issue 7 Section A8.1 (d) For frequency hopping system operating in the 2400-2483.5MHz band, the average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.
Deviations from Standard Test procedures	:	None
Test Procedure	:	Procedure specified in ANSI C63.4
Kind of test site	:	Shielded room
Operation mode	:	Bluetooth transmitting with hopping at the full channel set (DH5 mode)
Power supply	:	DC 12V
Temperature	:	23°C
Humidity	:	50%

**Test procedure:**

1. Connect the antenna port of the EUT to the spectrum analyzer by a low lost cable.
2. Set the EUT to proper test mode with relative test software and hardware.
3. Spectrum analyzer setting: Centered Frequency = measured channel, RBW = 1MHz, VBW $\geq$ RBW, Frequency Span = 0 Hz.
4. Set sweep time properly to capture the entire dwell time per hopping channel.
5. Set detector type to Peak and trace mode to Max Hold and make the measurement.
6. Repeat step 3-5 until all channels measured were complete.



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**Table 12: Dwell Time (DH5 mode)**

channel	Frequency (MHz)	Dwell time of one signal Burst (ms)	Total Dwell Time (ms)	Limit (ms)
Low	2402	3.10	$(3.10 \times \mathbf{106.81}) = 331.11$	400
Mid	2441	3.07	$(3.07 \times \mathbf{106.81}) = 327.91$	400
High	2480	3.10	$(3.10 \times \mathbf{106.81}) = 331.11$	400

**Note :**

DH5 mode was found to be the worst case in the test.

Period = 0.4 (seconds) x 79 (channels) = 31.6 seconds

For Bluetooth system, there are 1600 timeslots in one second. The DH5 mode operates on a 5-slot transmission and 1-slot receiving basis. Thus there are  $1600 / (5+1) = 266.7$  transmission per second. In one period for each particular channel there are  $(266.7/79) \times 31.6 = 106.81$  times of transmission.

Dwell Time in one period(ms) = Dwell time of one-slot transmission(ms) multiplexes **106.81**

Please refer to Appendix 1 for measurement data.

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## 5.9 Out-of-Band Emission

**RESULT:**

**Pass**

Date of testing : July 22, 2010  
Test specification : FCC Part 15 Per Section 15.247(d)  
RSS-210 Issue 7 A8.5  
Limits : FCC Part 15 Per Section 15.247(d)  
RSS-210 Issue 7 A8.5

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

In addition:

FCC Part 15 - radiated emission which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a).

RSS-210 Section 2.2- Unwanted emissions falling into restricted bands of Table 1 shall meet Tables 2 and 3 limits.

Deviations from Standard Test procedures : None  
Test Procedure : Procedure specified in ANSI C63.4/RSS-Gen were followed  
Kind of test site : Shielded room  
Operation mode : Transmitting at BR / EDR mode  
Power supply : DC 12V  
Temperature : 23°C  
Humidity : 50%

**Test procedure:**

1. Connect the antenna port of the EUT to the spectrum analyzer by a low loss cable.
2. Set the EUT to proper test mode with relative test software and hardware.
3. Spectrum analyzer setting: RBW = 100 kHz, VBW≥RBW.
4. Set proper frequency span respectively for out-of-band emission measurement of the band edge and the whole range (up to 10 times of the carrier frequency.)
5. Set the trace mode to Max Hold and mark the peak reading of any spurious emission recorded.
6. The band edge radiated emission was measured according to the procedure in clause 5.2 of this report.

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**Table 13: Out-Of-Band Emission measurement (conducted)**

<b>Emission (Max reading among Channel low, mid and high)</b>	<b>Attenuation</b>	<b>Limit (dB)</b>
30MHz to 25GHz	All emission in this 100kHz bandwidth are attenuated more than 20dB from the carrier	$\Delta \geq 20$

\* **Note:** Please refer to the Appendix 1 for the plot of the peak value.

**Table 14: Band Edges Emission in the Restricted Bands (BR mode)**

<b>Frequency [MHz]</b>	<b>dBc [dB]</b>	<b>PK [dB<math>\mu</math>V/m]</b>	<b>AV [dB<math>\mu</math>V/m]</b>	<b>Polarity (H/V)</b>	<b>PK limit [dB<math>\mu</math>V/m]</b>	<b>AV limit [dB<math>\mu</math>V/m]</b>
2483.9	48.3	47.8	---	V	74	54
<b>Remark:</b> The max. peak carrier field strength of the high channel is 96.12dBuV/m (vertical)						

**Table 15: Band Edges Emission in the Restricted Bands (EDR mode)**

<b>Frequency [MHz]</b>	<b>dBc [dB]</b>	<b>PK [dB<math>\mu</math>V/m]</b>	<b>AV [dB<math>\mu</math>V/m]</b>	<b>Polarity (H/V)</b>	<b>PK limit [dB<math>\mu</math>V/m]</b>	<b>AV limit [dB<math>\mu</math>V/m]</b>
2483.5	46.0	49.3	---	V	74	54
<b>Remark:</b> The max. peak carrier field strength of the high channel is 95.36dBuV/m (vertical)						

**NOTE:**

1. Marker-delta method was used to calculate the band edges emission: The dBc value between the carrier maximum power and band edge emission power of the frequency listed in the table is calculated from the test record showed in Appendix 1.

Peak value of the high/low band edge emission listed in the table is calculated by the below formula:  
PK value of band edge emission = Peak carrier field strength – dBc value

2. Disturbances other than those mentioned above are small or not detectable.

## 5.10 Exemption from Routine Evaluation Limits – SAR Evaluation

**RESULT:**

**Pass**

Date of testing : June 22, 2010  
 Test specification : RSS-102 Issue 2 Section 2.5.1  
 Limits : RSS-102 Issue 2 Section 2.5.1

SAR evaluation is required if the separation distance between the user and the device is less than or equal to 20 cm, except when the device operates:

above 2.2 GHz up to 3 GHz inclusively and its output power (i.e. the higher of the conducted or radiated (e.i.r.p.) source-based time-averaged output power) is less than, or equal to 20 mW for General Public Use and 100 mW for Controlled Use

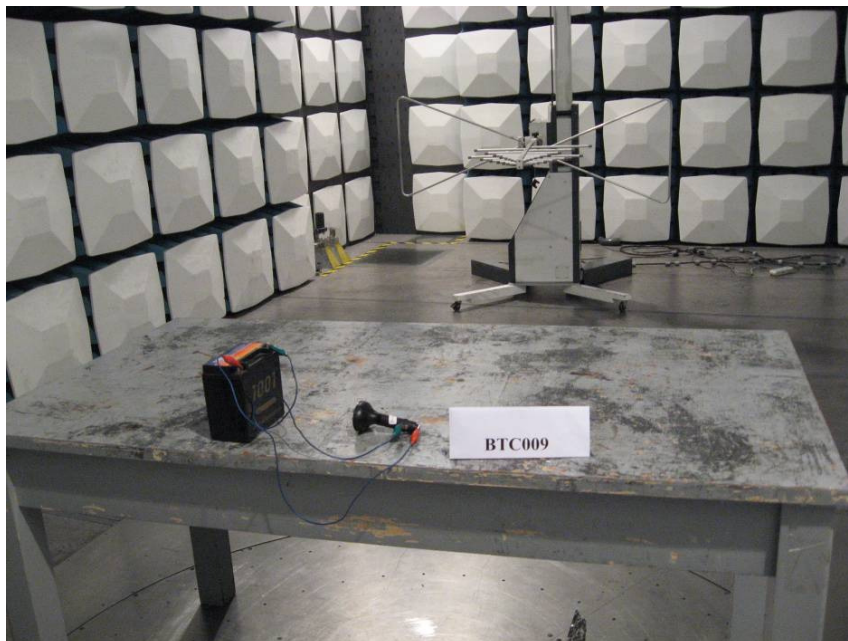
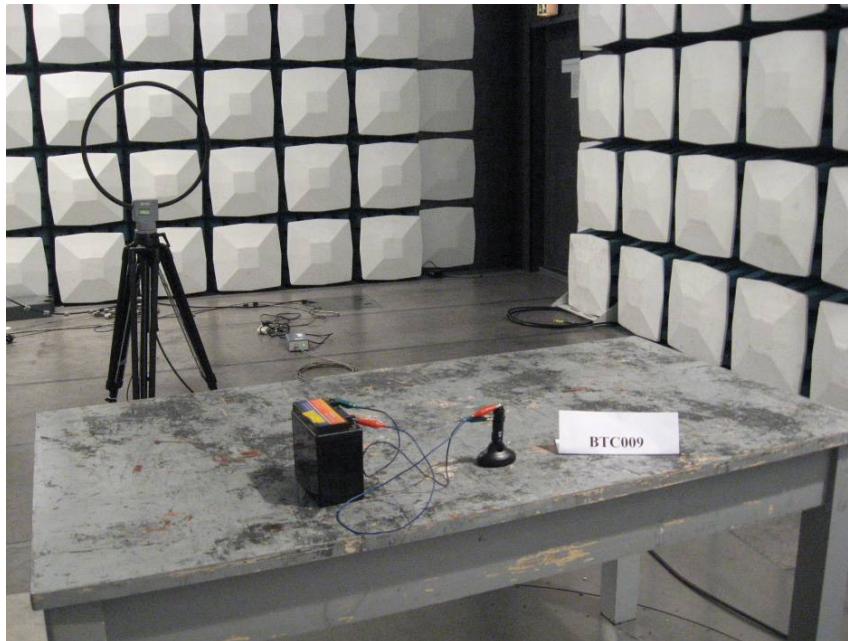
**Table 16: e.i.r.p**

Mode	Channel	Peak Conducted Output Power	Antenna Gain	e.i.r.p		Limit
				(dBm)	(dBi)	
BR	Low	6.38	2	8.38	6.89	20
	Mid	6.51	2	8.51	7.10	20
	High	6.00	2	8.00	6.31	20
EDR	Low	4.67	2	6.67	4.65	20
	Mid	4.74	2	6.74	4.72	20
	High	4.11	2	6.11	4.08	20

Since the calculation above showed the e.i.r.p of the device is less than 20mW, the SAR evaluation is not required.

## 6 Photographs of the Test Set-Up

**Photograph 1: Set-up for Radiation Measurement below 1GHz**

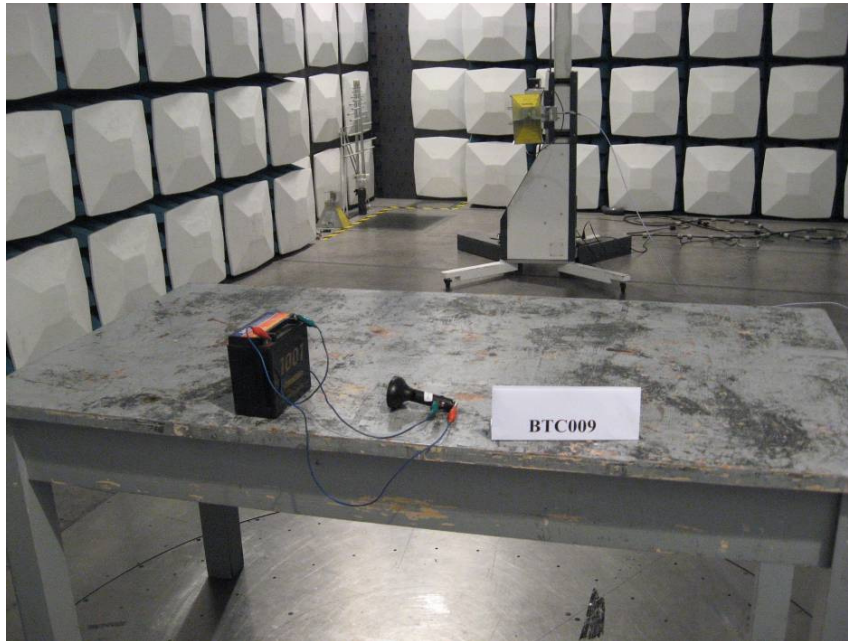


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**Photograph 2: Set-up for Radiation Measurement above 1GHz**



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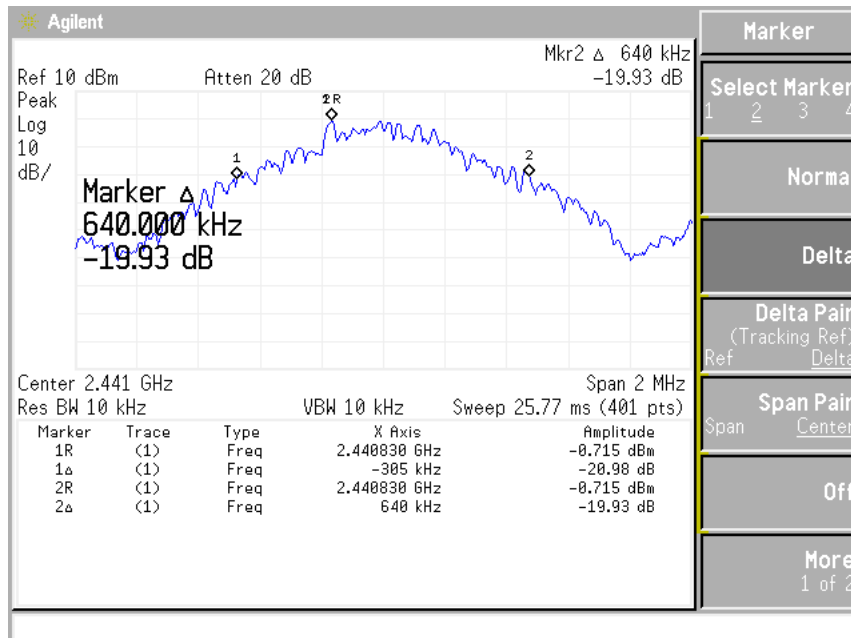
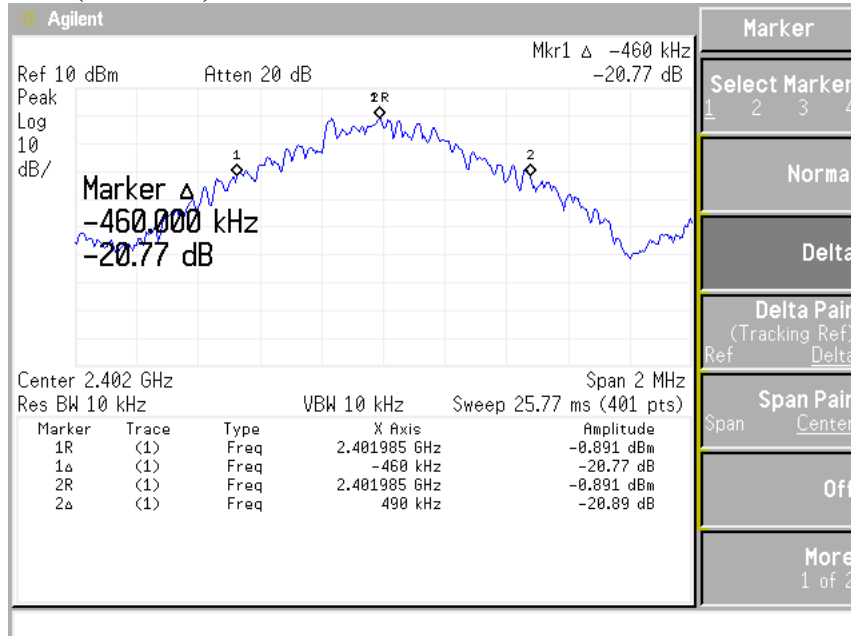
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20dB Bandwidth (BR mode)





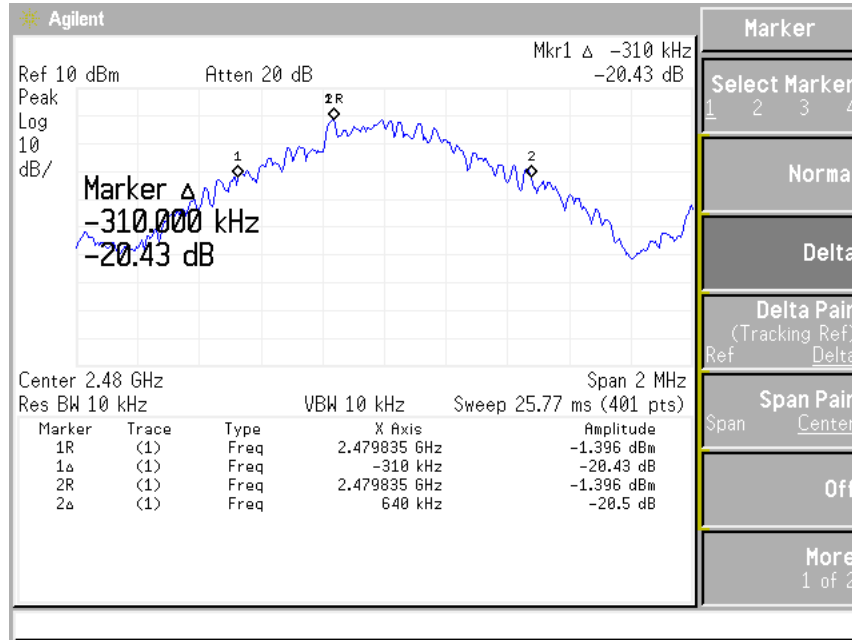
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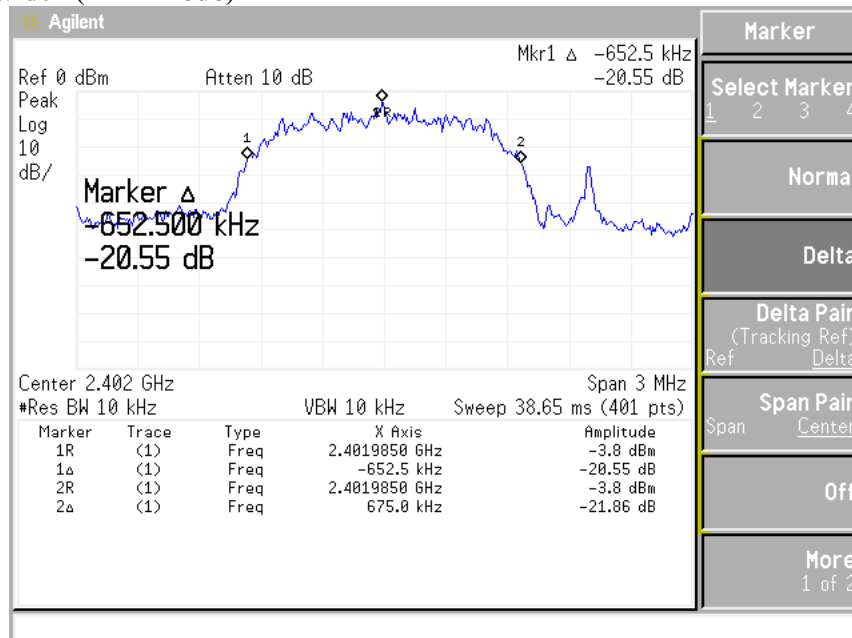
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20dB Bandwidth (EDR mode)



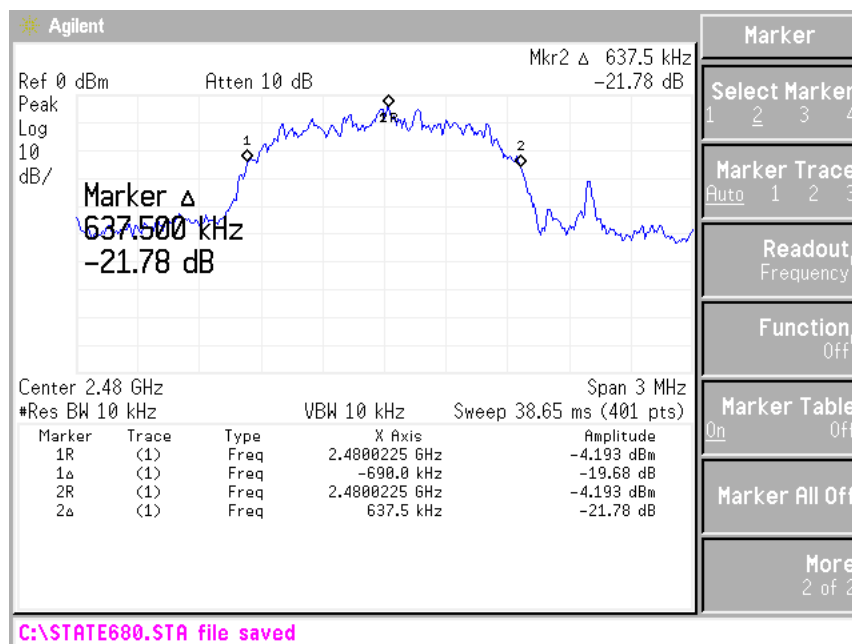
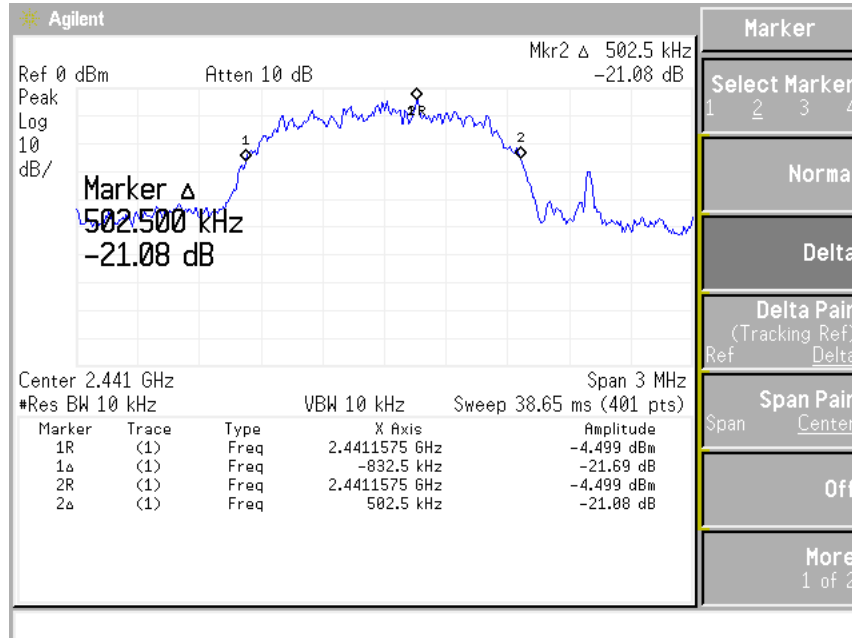
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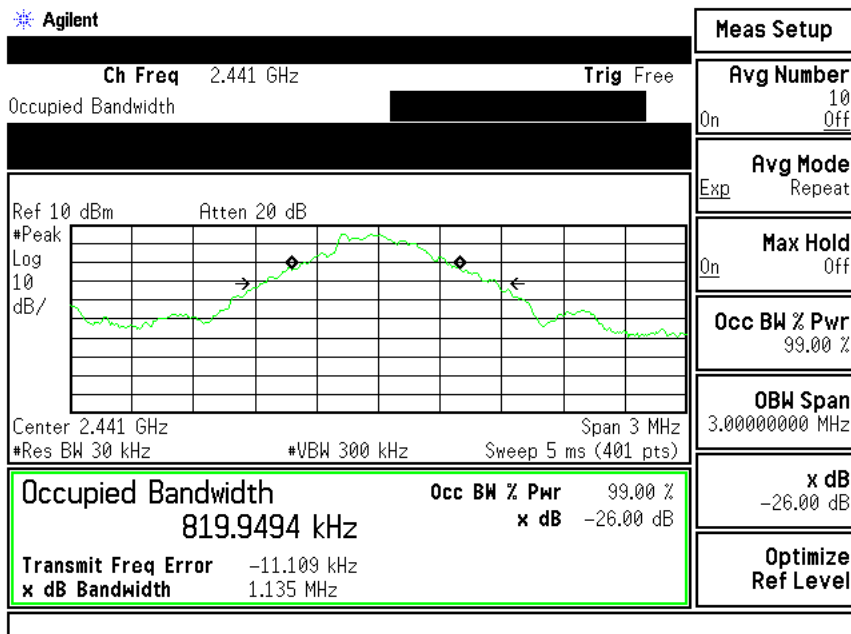
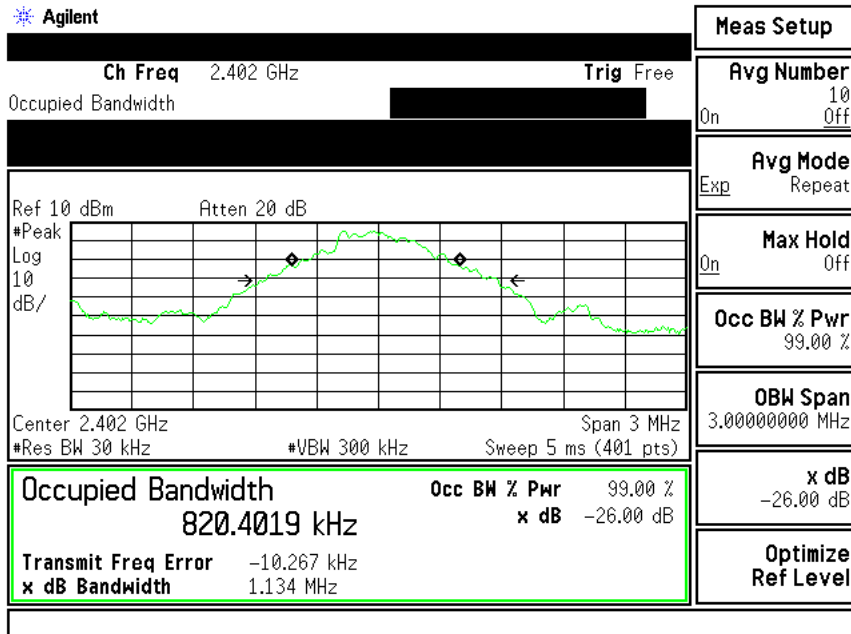
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99% Occupied Bandwidth (BR mode)



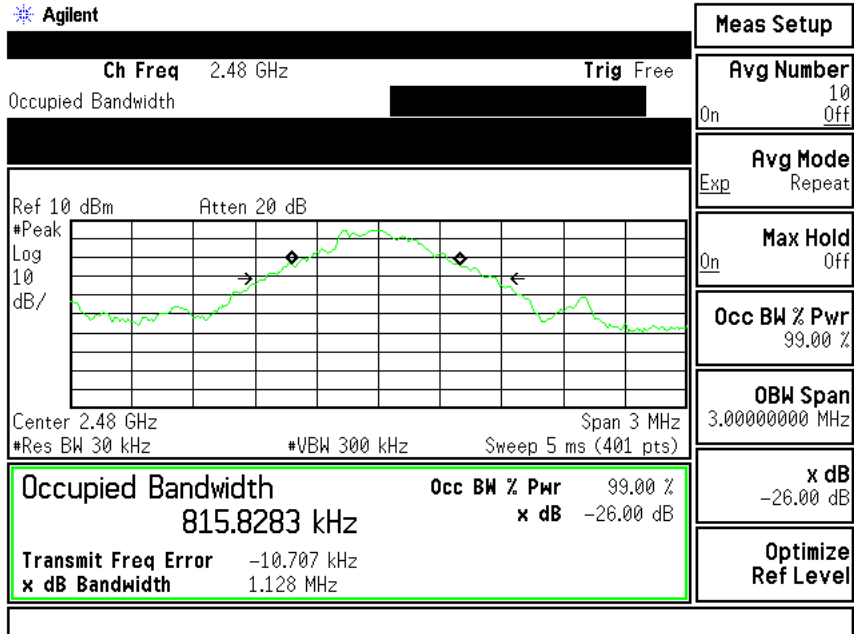
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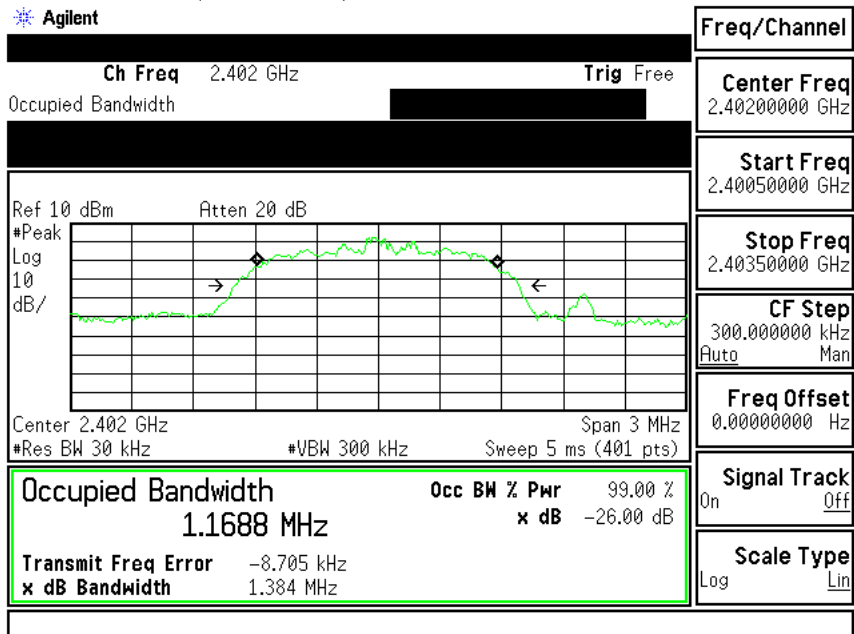
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**99% Occupied Bandwidth (EDR mode)**



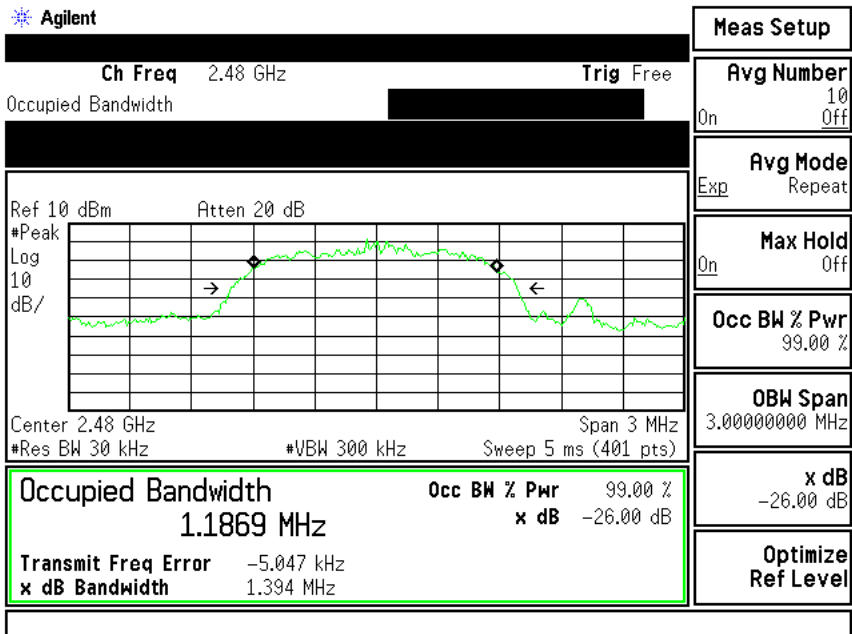
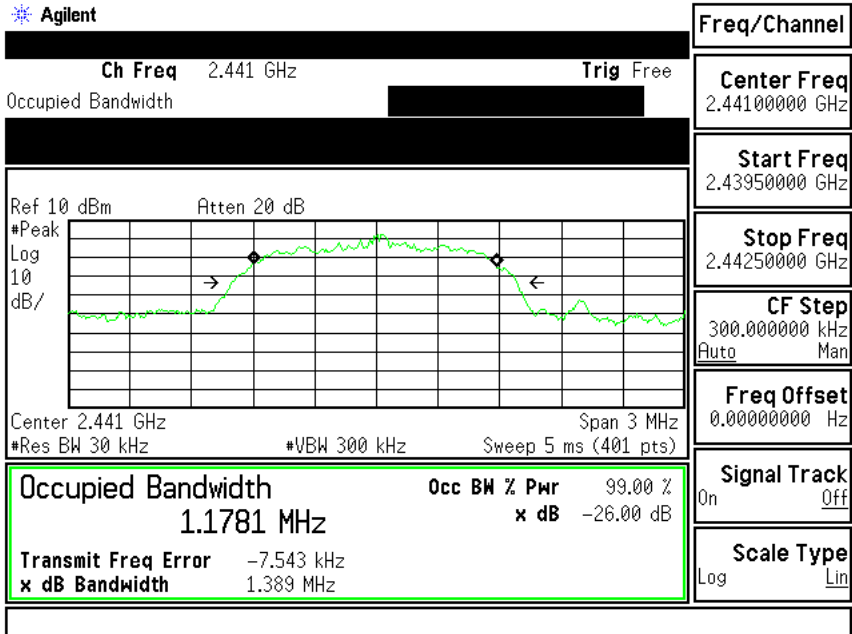
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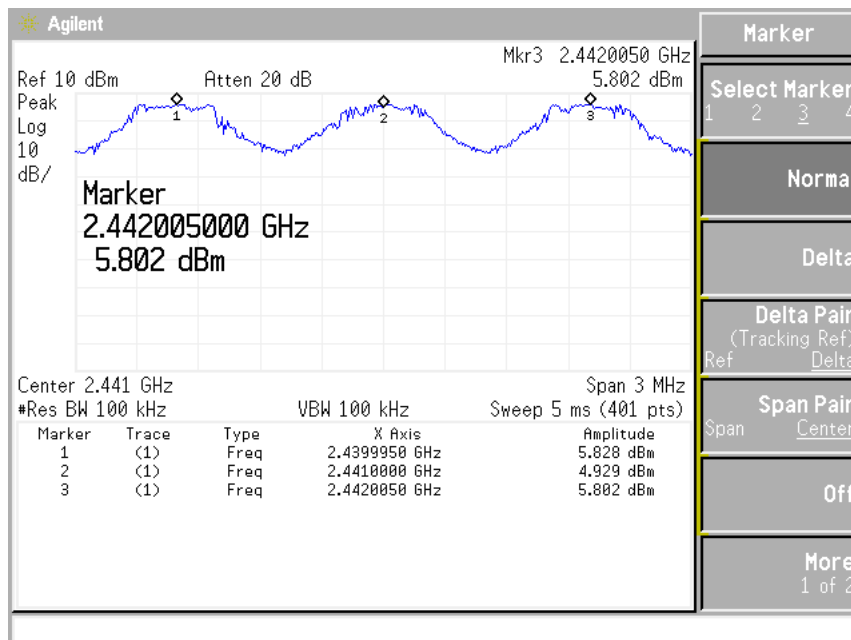
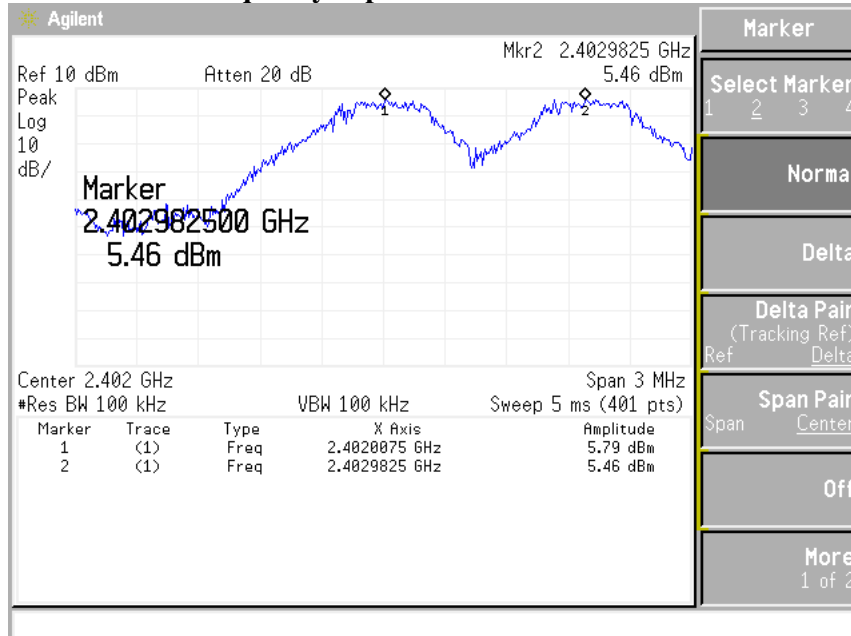
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Hopping Channel Carrier Frequency Separation



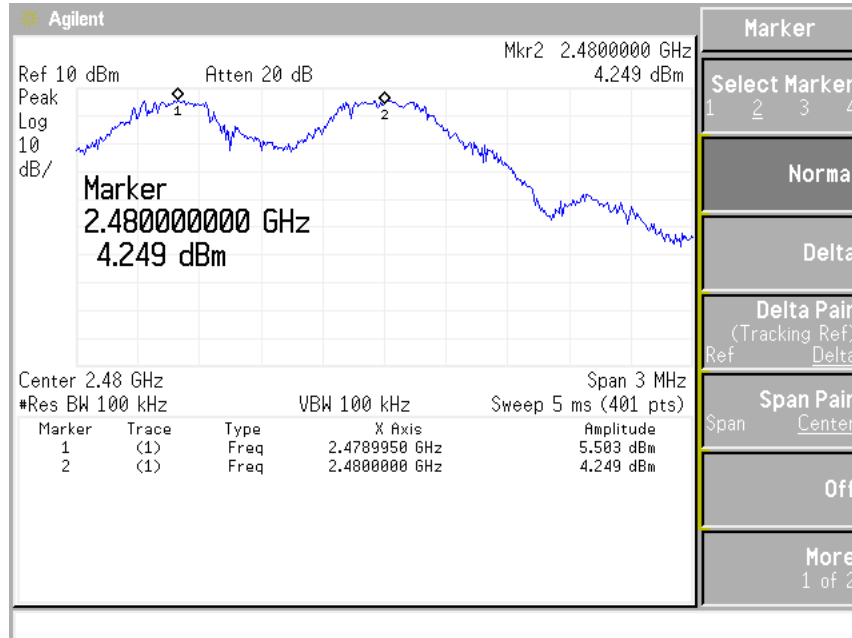
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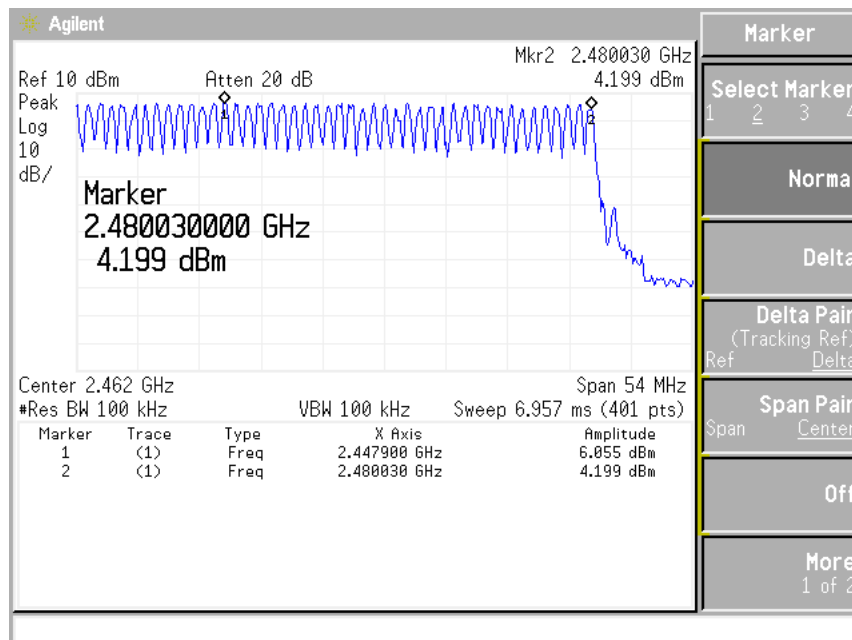
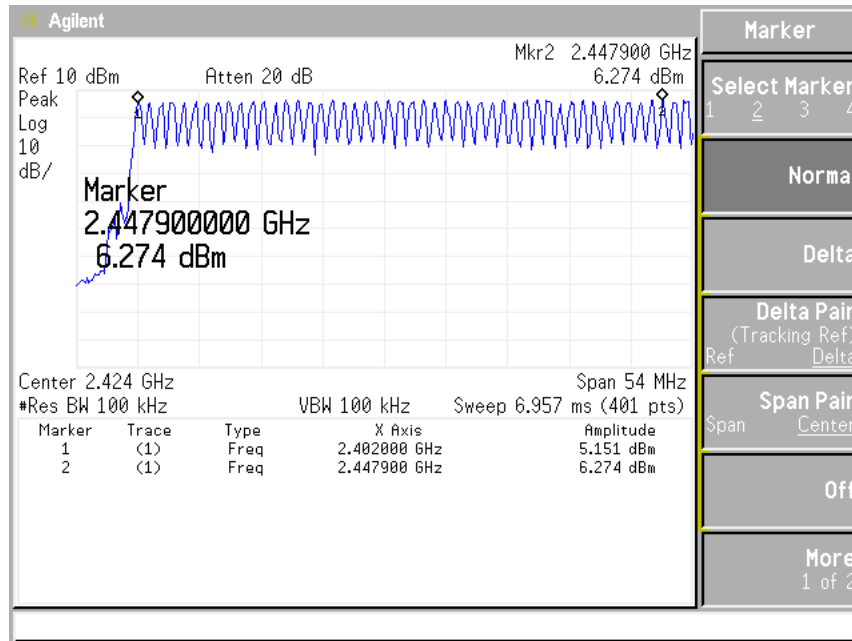
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**Number of Hopping Frequency Used**





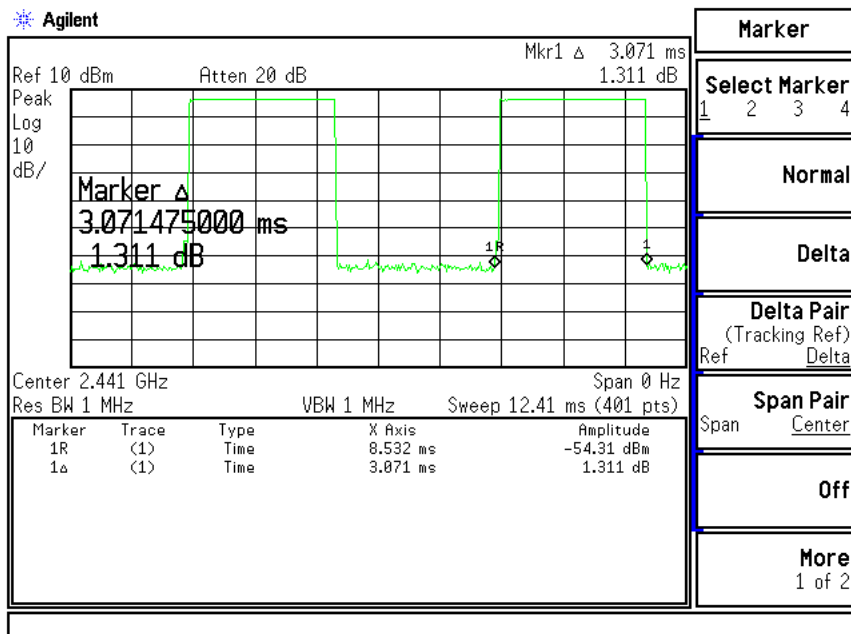
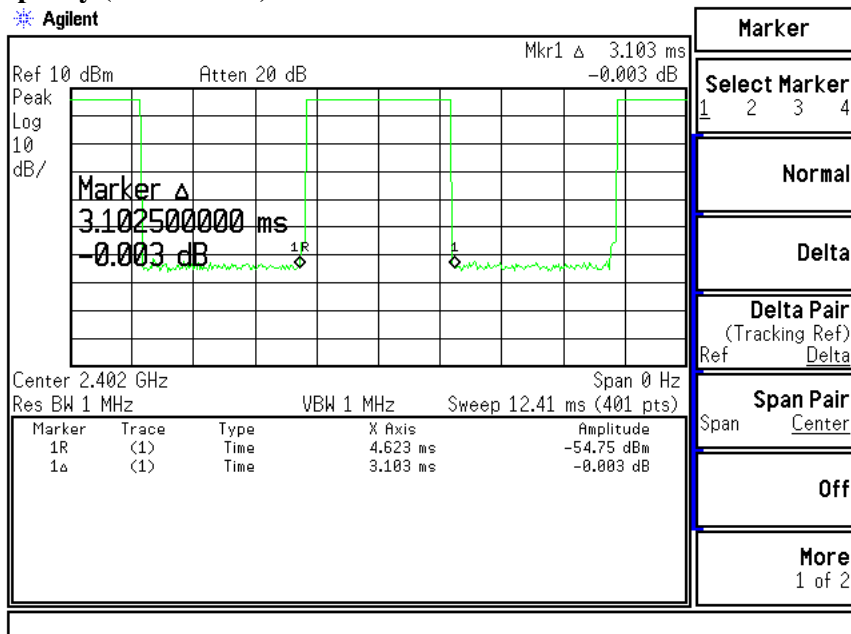
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Time of Occupancy (Dwell Time)



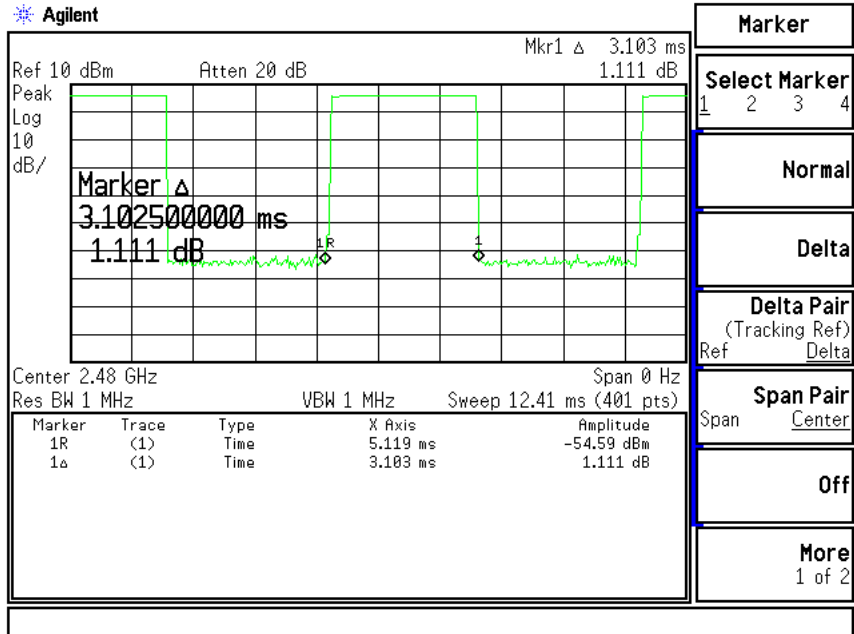
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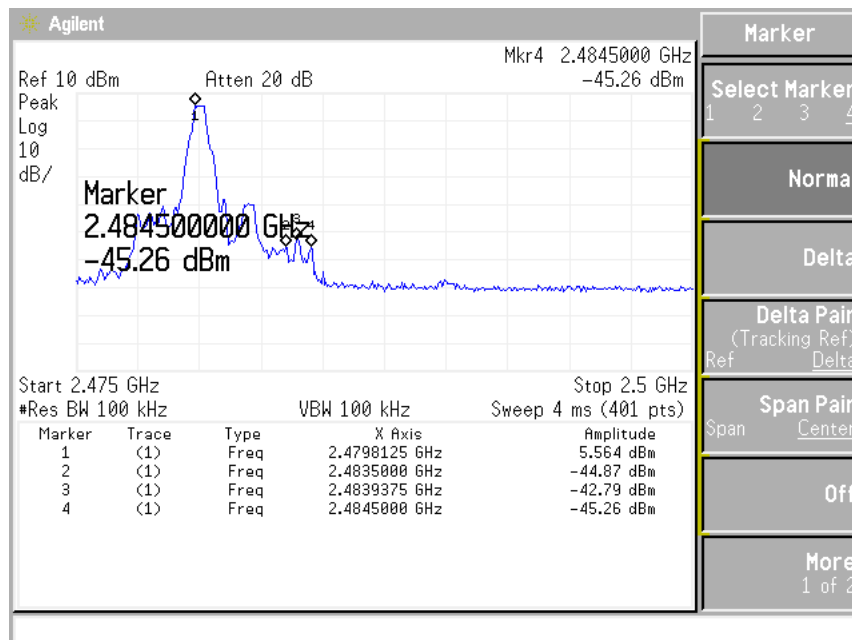
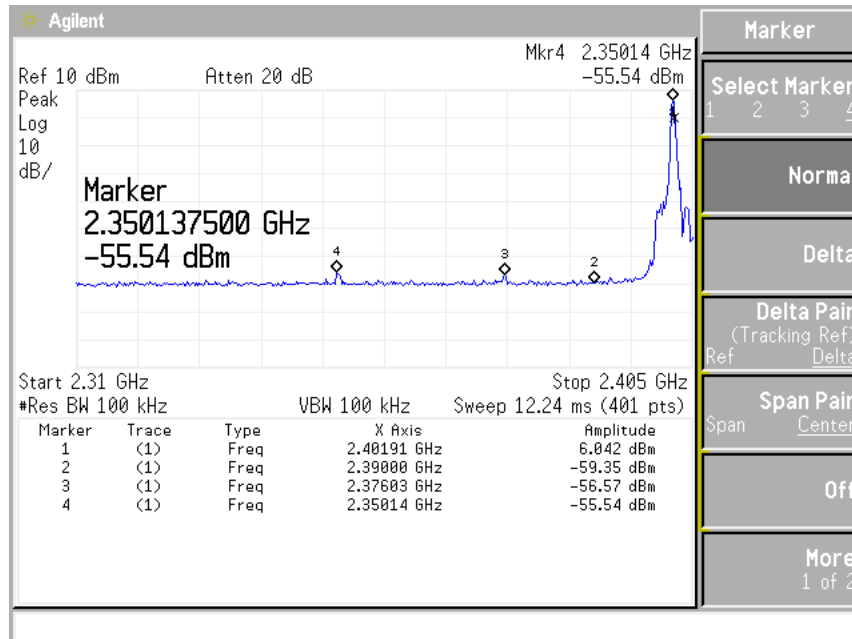
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**Band Edge Emission (BR mode)**



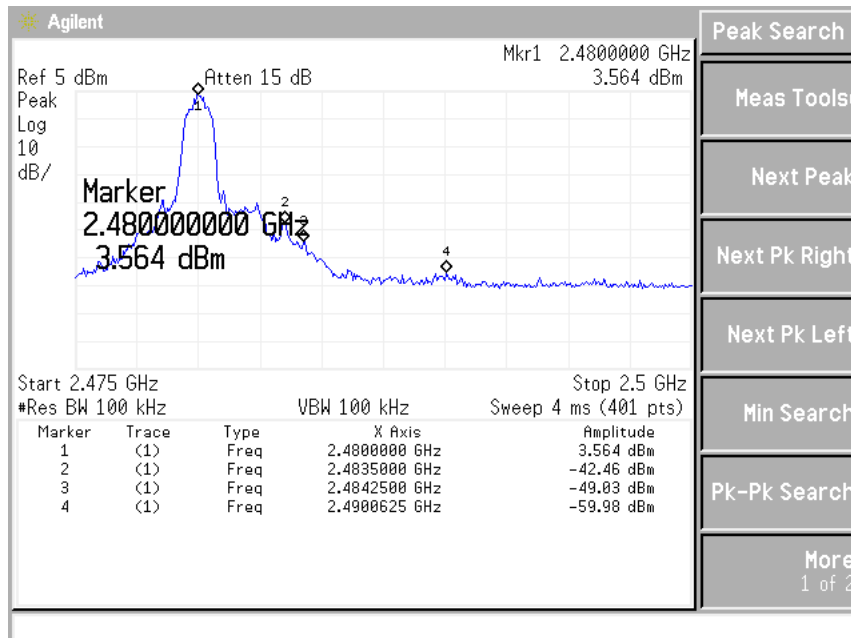
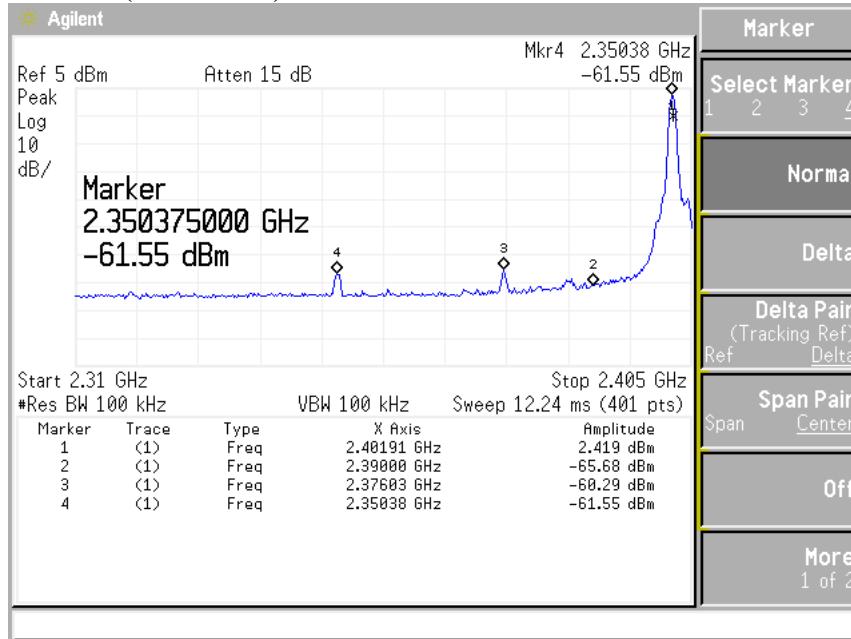
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**Band Edge Emission (EDR mode)**



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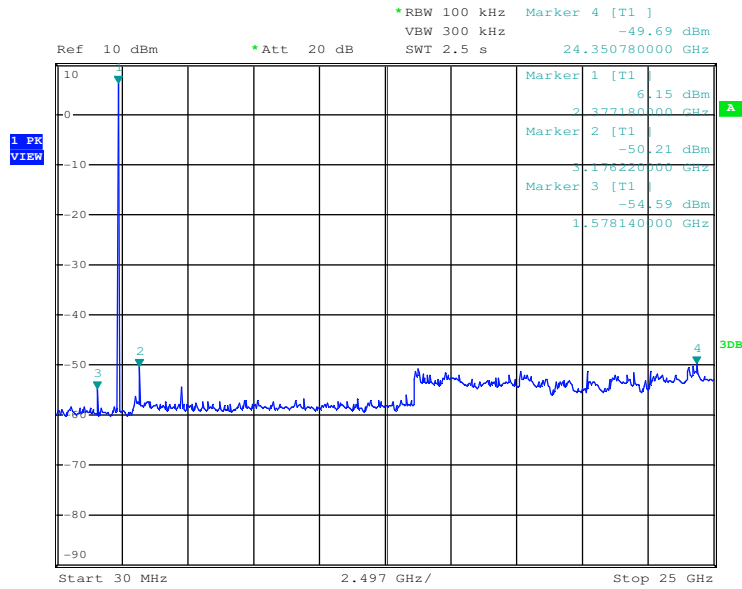
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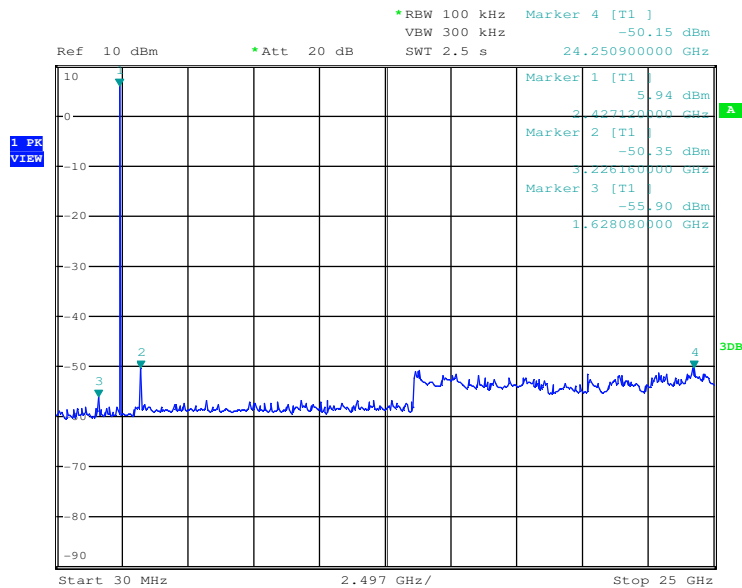
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Out-Of-Band Emission (BR mode)



Date: 24.JUL.2010 06:06:18



Date: 24.JUL.2010 06:07:39

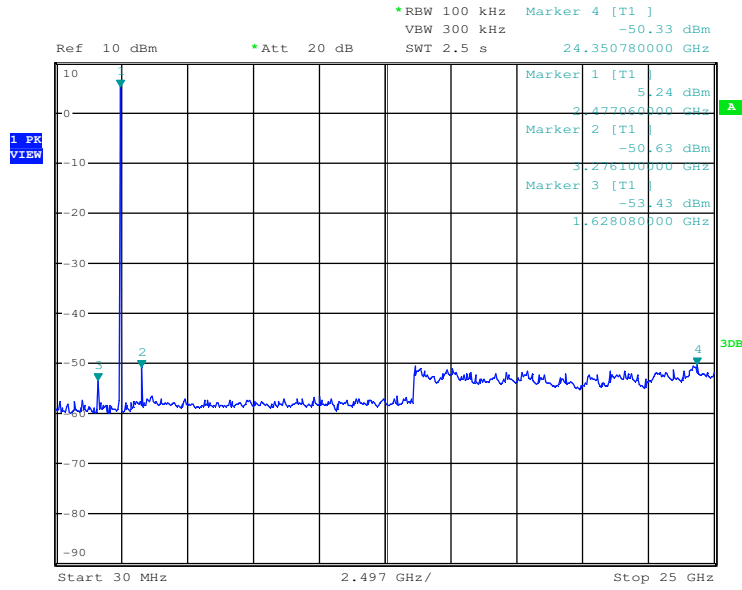
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Date: 24.JUL.2010 06:12:13

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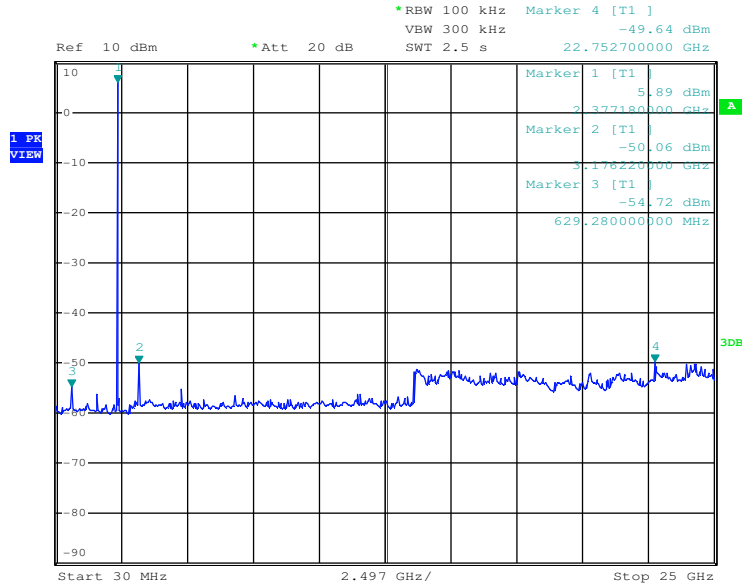
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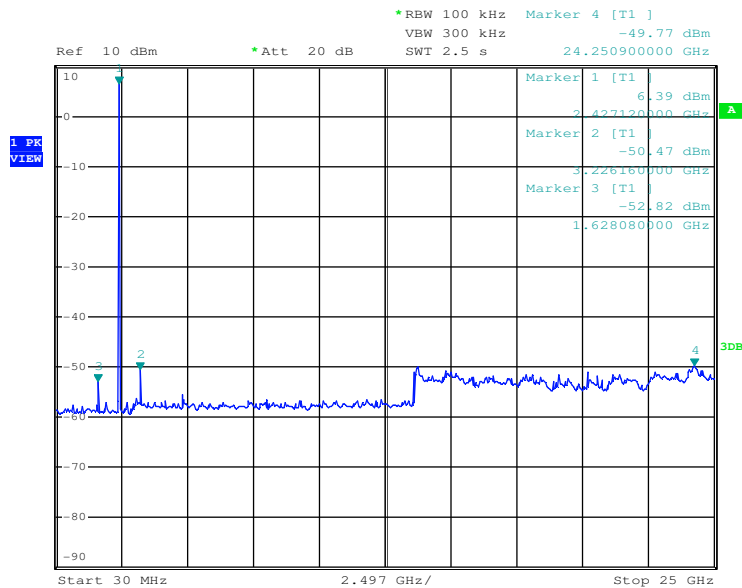
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Out-Of-Band Emission (EDR mode)



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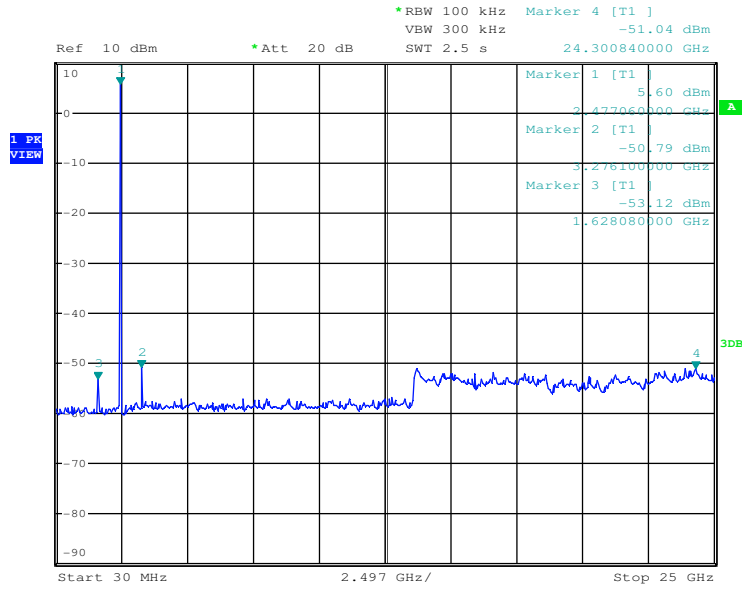
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